

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Canceled).

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Claim 2 (Currently Amended): A video encoding apparatus according to claim 1,
comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein said the encoding parameter generator section includes a setting unit configured to set a weight to a quantization step size for macro blocks of frames to be encoded for each scene on the bases of the statistical feature amount relating to a distribution of luminance for each macro block.

Claim 3 (Currently Amended): A video encoding apparatus according to claim 1, comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein said the feature amount computation section unit includes a classification unit configured to classify the plurality of scenes into a plurality of scene types, based on the statistical feature amount relating to a motion vector, and said the encoding parameter generator section includes a setting unit configured to set a weight to a frame rate and a quantization step size for each scene according to the scene types.

Claim 4 (Currently Amended): [[A]] The video encoding apparatus according to claim 3, wherein said the encoding parameter generator section includes a setting unit

configured to set a weight to a quantization step size for macro blocks of frames to be encoded for each scene on the bases of the statistical feature amount relating to a distribution of luminance for each macro block.

Claim 5 (Currently Amended): A video encoding apparatus according to claim 1,
comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein said the feature amount computation section unit is configured to extract the number of motion vectors, a distribution of motion vectors, a vector size, a motion compensation residual error and a luminance/chrominance variance as feature amounts, and aggregate the feature amounts for each scene to obtain the statistical feature amount for each scene.

Claim 6 (Currently Amended): [[A]] The video encoding apparatus according to claim 5, wherein said the encoding parameter generator seetion is configured to estimate a motion of an object included in the scenes based on the statistical feature amount and compute a frame rate and a quantization step size which are suitable for each scene based on an estimation result representing the motion of the object.

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Claim 7 (Currently Amended): [[A]] The video encoding apparatus according to claim 6, wherein said the encoding parameter generator seetion includes a setting unit configured to check a distribution of luminance for each of macro blocks configuring each scene and set the quantization step size for each of the macro blocks so as to reduce the quantization step size for macro blocks where mosquito noise is likely to occur or object edges are present, compared to the other macro blocks.

Claim 8 (Currently Amended): A video encoding apparatus according to claim 1,
comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein said the number-of-generated-bits prediction section unit is configured to calculate the number of generated bits for each scene when said the encoder section encodes the input video signal based on a frame rate and a quantization step size which are obtained as the encoding parameter, and predict the number-of-generated bits.

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Claim 9 (Currently Amended): A video encoding apparatus according to claim 1, comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter
and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as
an encoded output,

wherein said the encoding parameter correcting ~~section~~ unit is configured to correct a bit rate for each scene as an encoding parameter for the purpose of encoding the input video signal so as to satisfy a target bit rate specified by a user.

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Claim 10 (Currently Amended): A video encoding apparatus ~~according to claim 1,~~
comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter
and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as
an encoded output,

wherein said the encoder section is configured to receive a bit rate and a frame rate which are specified for each scene as the corrected encoding parameter, and encode the input video signal according to the bit rate and the frame rate so that the bit rate for each scene coincides with the specified bit rate.

Claim 11 (Currently Amended): A video encoding apparatus ~~according to claim 1,~~
comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein said the encoder section includes a determination unit configured to receive a bit rate specified for each scene as the corrected encoding parameter, and determine a

quantization step size and an interval between frames to be encoded, using an occupancy of a virtual buffer which changes in correspondence with the bit rate specified for each scene.

Claim 12 (Currently Amended): A video encoding apparatus ~~according to claim 1,~~
comprising:

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein ~~said~~ the feature amount computation ~~section~~ unit includes a determination unit configured to determine a second frame as a delimiter for separating the scenes if a difference between a first frame and the second frame adjacent thereto exceeds a predetermined threshold and a difference between the first frame and a third frame also exceeds the threshold, and ~~not~~ fails to determine the second frame as the delimiter if the

difference between the first frame and the second frame exceeds a predetermined threshold but the difference between the first frame and the second frame ~~does not~~ fails to exceed the threshold.

Claim 13 (Currently Amended): A video encoding apparatus ~~according to claim 1, comprising:~~

a feature amount computation unit configured to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame, and compute a statistical feature amount for each scene;

an encoding parameter generator to generate an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computation unit;

a number-of-generated-bits prediction unit configured to predict the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generator;

an encoding parameter correcting unit configured to correct the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits prediction unit;

an encoder to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream; and

an output unit configured to output the encoded bit stream generated by the encoder as an encoded output,

wherein said the feature amount computation section unit is configured to compute motion vectors of macro blocks of each of all frames of the input video signal, a motion compensation residual error, and an average and variance of the luminance to obtain the feature amount.

Claim 14 (Currently Amended): [[A]] The video encoding apparatus according to claim 13, wherein said the feature amount computation seetion unit is configured to classify the scenes into a plurality of scene types according to a distribution of motion vectors of each frame, and said the encoding parameter generator seetion includes a determination unit configured to determine a frame rate and a bit rate for each scene using the scene types and the feature amount.

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Claim 15 (Canceled).

Claim 16 (Currently Amended): A video encoding method ~~according to claim 15, comprising:~~

dividing an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame;
computing a statistical feature amount for each scene;
generating an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computing step;
predicting the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generating step;
correcting the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits predicting step; and
encoding the input video signal using the corrected encoding parameter to generate an encoded bit stream.

wherein the encoding parameter generating step includes setting a weight to a quantization step size for macro blocks of frames to be encoded for each scene on the bases of the statistical feature amount relating to a distribution of luminance for each macro block.

Claim 17 (Currently Amended): A video encoding method according to claim 15,
comprising:

dividing an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame;

computing a statistical feature amount for each scene;

generating an encoding parameter for each scene based on the statistical feature amount computed by the feature amount computing step;

predicting the number of bits to be generated when the input video signal is encoded using the encoding parameter generated by the encoding parameter generating step;

correcting the encoding parameter based on a result of the prediction of the number of generated bits which is obtained by the number-of-generated-bits predicting step; and

encoding the input video signal using the corrected encoding parameter to generate an encoded bit stream,

wherein said the feature amount computing step includes classifying the plurality of scenes into a plurality of scene types, based on the statistical feature amount relating to a motion vector, and said the encoding parameter generating step includes setting a weight to a frame rate and a quantization step size for each scene according to the scene types.

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Claim 18 (Currently Amended): [[A]] The method according to claim 17, wherein the encoding parameter generating step includes setting a weight to a quantization step size for macro blocks of frames to be encoded for each scene on the bases of the statistical feature amount relating to a distribution of luminance for each macro block.

Claim 19 (Currently Amended): A recording medium having a computer program recorded therein for encoding an input video signal, said the computer program comprising:

instruction means for instructing the computer to divide an input video signal into a plurality of scenes each comprising at least one temporally-continuous frame and compute a statistical feature amount for each scene;

instruction means for instructing the computer to generate an encoding parameter for each scene based on the statistical feature amount;

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instruction means for instructing the computer to predict the number of bits generated when said the input video signal is encoded using the encoding parameter;

instruction means for instructing the computer to correct the encoding parameter based on a result of the prediction of the number of generated bits; and

instruction means for instructing the computer to encode the input video signal using the corrected encoding parameter and generate an encoded bit stream,

wherein the means for instructing the computer to generate the encoding parameter includes means for instructing the computer to set a weight to a quantization step size for macro blocks of frames to be encoded for each scene on the bases of the statistical feature amount relating to a distribution of luminance for each macro block.
